

First report of the genus *Anamalaia* Munroe & Mutuura, 1969 (Lepidoptera: Crambidae) from China, with descriptions of two new species

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Abstract: The genus *Anamalaia* Munroe & Mutuura, 1969 is recorded for the first time from China. Two new species are described: *A. acerisella* Li sp. nov. and *A. obtusisella* Li sp. nov. Diagnoses of these new species are provided, along with photographs of their adults and genitalia.

Key words: Microlepidoptera; Pyraloidea; Pyraustinae; taxonomy

腹刺野螟属 *Anamalaia* 在中国的首次报道及二新种记述 (鳞翅目: 草螟科)

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摘要: 首次报道了中国新纪录属——腹刺野螟属 *Anamalaia* Munroe & Mutuura, 1969 的分布。记述了 2 新种: 尖突腹刺野螟 *A. acerisella* Li sp. nov. 和圆突腹刺野螟 *A. obtusisella* Li sp. nov.。提供了新种的鉴别特征及成虫和外生殖器特征图。

关键词: 小蛾类; 螟蛾总科; 野螟亚科; 分类

Introduction

Anamalaia Munroe & Mutuura, 1969 was erected with *A. nathani* Munroe & Mutuura, 1969 from India as its type species. No additional species have been added to *Anamalaia* since its establishment. This genus is characterized by the forewing in male having a large fovea beneath the middle of the lower margin of the cell (Fig. 5); venation (Figs. 1, 2) with R₃ and R₄ stalked basally, R₅ much more remote to R₄ than to M₁, M₂, M₃ and CuA₁ close and almost evenly spaced at base; in the male genitalia, by the transtilla touching medially, the editum bearing scale-like setae, the vinculum with a process in the middle on the dorsal surface, the sacculus with a sclerotized dorsal process, and the phallus with a bundle of compact, sometimes deciduous, spines (Figs. 11, 12); in the female genitalia by the developed lamella antevaginalis, the ductus bursae with a sclerite basally, and the corpus bursae with a pair of sclerites at the entrance and the rhomboidal signum with a medially interrupted transverse carina (Figs. 13–15).

Larvae of *A. nathani* fed on *Cinchona* sp. of Rubiaceae (Munroe & Mutuura 1969).

This paper reports the genus *Anamalaia* for the first time from China, and adds two new

species to this genus based on specimens collected in Fujian, Guangxi, Hainan and Yunnan.

Material and methods

This study is based on the examination of specimens collected by light traps. Images of adults and venation were taken using a Leica M205A stereomicroscope. Images of genitalia were prepared with a Leica DM750 microscope. Permanent slide mounting methods of genitalia and venations follow the techniques introduced by Li (2002). All the studied specimens are deposited in the Insect Collection, College of Life Sciences, Nankai University, Tianjin, China (NKU).

Taxonomy

Anamalaia Munroe & Mutuura, 1969

Munroe & Mutuura, 1969, *Canadian Entomologist*, 101: 1242. Type species: *Anamalaia nathani* Munroe & Mutuura, 1969, by monotype.

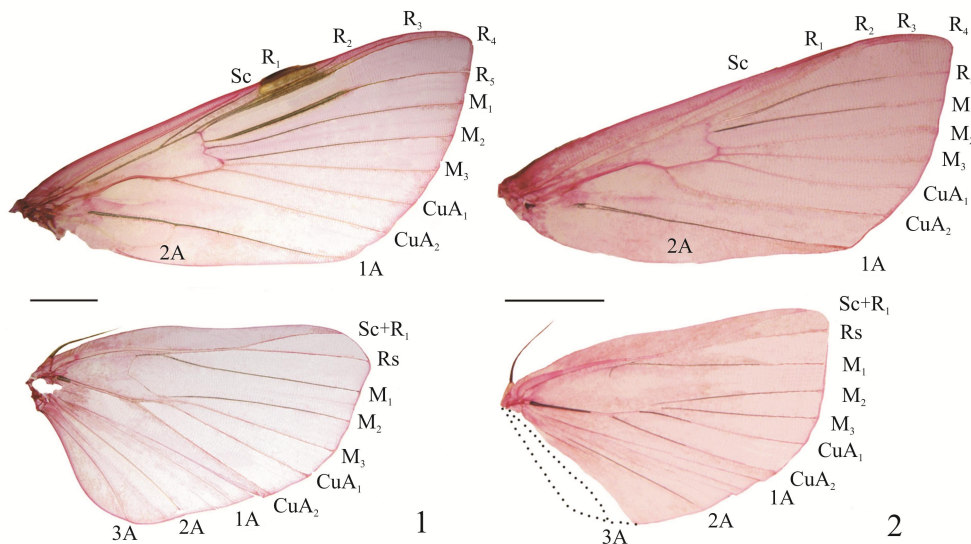
Diagnosis. *Anamalaia* is similar to *Demobotys* Munroe & Mutuura, 1969. It can be separated by the forewing in male having a strong fovea beneath the middle of the lower margin of the cell that causes the lower margin of the cell to be arched dorsad; in the male genitalia by the transtilla arms meeting medially and the phallus spinulose distally. In *Demobotys*, the forewing in male has no fovea and the lower margin of the cell is normal, the transtilla is absent and the phallus is smooth distally.

Key to species of the genus *Anamalaia* based on the male genitalia

1. Sella without denticles, broadly rounded apically (Munroe & Mutuura 1969: Fig. 10)..... *A. nathani*
- Sella with denticles, pointed or narrowly rounded apically2
2. Sella thorn-shaped, acute at apex (Fig. 11) *A. acerisella* **sp. nov.**
- Sella being a slender bar, narrowly rounded at apex (Fig. 12) *A. obtusisella* **sp. nov.**

1. *Anamalaia acerisella* Li **sp. nov.** (Figs. 1, 3–8, 11, 13, 14)

Description. Adult (Figs. 3–8) wingspan 23.0–27.0 mm. Head with vertex earthy yellow; frons yellow, with a white stripe laterally. Antenna earthy yellow, scape and basal two to six flagellomeres white on anterior margin. Labial palpus with first segment white; second segment earthy yellow except ventral 1/6 white; third segment earthy yellow. Maxillary palpus earthy yellow. Proboscis with basal scales white. Thorax and tegula earthy yellow. Forewing greyish earthy yellow, darker in basal and distal regions; markings grey: antemedial line starting from basal 1/4 of costal margin to basal 1/4 of dorsum, slightly arched outward; discal stigma greyish black; postmedial line from distal 1/3 of costal margin slightly oblique outward to middle of CuA₁, then retracted to middle of CuA₂, finally oblique inward to distal 2/5 of dorsum; male with a glandular swelling at costal margin before postmedial line; termen with blackish brown dots. Hindwing greyish earthy yellow, distal region beyond postmedial line darker; postmedial line grey, from distal 2/5 of Rs oblique outward to distal 1/4 of 1A, then retracted to distal 1/4 of 2A, nearly straight to anal angle; termen with blackish brown dots.



Figures 1, 2. Wing venation of *Anamalaia* spp. 1. *A. acerisella* sp. nov., male, slide No. QWD17415W; 2. *A. obtusisella* sp. nov., male, slide No. QWD17419W. Scale bars = 2.0 mm.

Male genitalia (Fig. 11). Uncus broad at base, narrowed toward rounded apex, with dense setae along distal 1/3 of lateral margin. Valva with basal 2/3 subparallel, distal 1/3 slightly narrowed to rounded apex; costa narrowly banded, tapering to distal 1/3 of costal margin, produced to a triangular process ventrobasally; transtilla thorn-shaped, meeting medially. Saccus sclerotized, with short fine setae, truncate apically; dorsal process at middle, thorn shaped. Editum sub-square, with scale-like setae on dorsal margin, with dense fine setae on ventral half distally; sella thorn-shaped, dentate along outer side, acute at apex. Juxta widened from middle to shallowly arched inward posterior margin, produced obliquely outward posterolaterally, concave at middle on both anterior and lateral margins. Vinculum triangular, with a narrow triangular process at middle on dorsal surface. Phallus approximately 4/5 length of valva, spinulose distally, with a cluster of compact spines at middle or occupying most of phallus, sometimes deciduous.

Female genitalia (Figs. 13, 14). Ovipositor rounded caudally, setose. Apophyses anteriores approximately two times length of apophyses posteriores. Lamella postvaginalis large, rectangular, spinulose, weakly sclerotized mediolongitudinally. Lamella antevaginalis heavily sclerotized, broad U-shaped, median part straight on anterior margin, widely and shallowly concave at middle on posterior margin; lateral arm densely spinulose, extending backward to a point, slightly oblique outward. Antrum uniform except slightly widened distally, folded laterally. Ductus bursae membranous, with a wide sclerite extending from end of antrum, nearly as long as antrum; ductus seminalis arising from base of this sclerite at right side. Corpus bursae round, with a pair of denticulate sclerites at entrance; appendix from middle of left side, slightly shorter than corpus bursae, ovate distally; signum sub-rhomboidal, covered with dense denticles arranged in numerous rows except rather smooth in median area, with a transverse carina interrupted medially, transverse angles prolonged to acute apex, longitudinal angles produced to a slender process.



Figures 3–10. Adults of *Anamalaia* spp. 3–6. *A. acerisella* sp. nov., holotype, male. 3. Dorsal surface of wings; 4. Ventral surface of wings; 5. Fovea; 6. Glandular swelling; 7. *A. acerisella* sp. nov., paratype, female; 8. *A. acerisella* sp. nov., paratype, male, from Yunnan; 9. *A. obtusisella* sp. nov., holotype, male; 10. Ventral surface of *A. obtusisella* sp. nov., holotype, male. Scale bars = 4.0 mm (Figs. 3, 4, 7–10); 1.0 mm (Figs. 5, 6).

Holotype. ♂, **China**, Bawangling, 19.10°N, 109.11°E, Changjiang County, Hainan Province, 245 m, 09-V-2013, coll. Yinghui SUN, Wei GUAN & Tengteng LIU, slide No. QWD17341.
Paratypes. 55♂11♀, **China**, Hainan Province: 2♂, 08–09-V-2013, other data same as holotype, slide Nos. QWD17339, QWD17347; 1♂, Mt. Limu, 650 m, 12-IV-2008, coll. Bingbing HU & Haiyan BAI, slide No. QWD17418; 1♂1♀, Mt. Limu, 700 m, 13–15-IV-2008, coll. Bingbing HU & Haiyan BAI, slide No. QWD17408W♂; 1♂1♀, Limushan Forest Park, 607 m, 15–17-V-2008, coll. Peixin CONG, Wei GUAN & Sha HU, slide No. QWD17256♂; 1♀, Limushan Nature Reserves, Qiongzong County, 640 m, 02-V-2014, coll. Tengteng LIU, Wei GUAN & Xuemei HU, slide No. QWD17426; 1♀, Limushan Nature Reserves, 632 m,

01-VII-2015, coll. Qingyun WANG, Suran LI & Mengting CHEN; 1♂, Qicha Town, Changjiang County, 125 m, 06-V-2013, coll. Yinghui SUN, Wei GUAN & Tengting LIU; 1♂, Yinggeling, 620 m, 18-IV-2010, coll. Bingbing HU & Jing ZHANG; 2♀, Maoyang Town, Wuzhishan City, 225 m, 20-IV-2009, coll. Qing JIN & Bingbing HU, slide Nos. QWD17345, QWD17409; 1♀, Shuiman Town, Wuzhishan City, 700 m, 18-IV-2013, coll. Yinghui SUN, Wei GUAN & Tengting LIU; 1♂, Tianchi, Jianfengling, 20-IV-2010, coll. Bingbing HU & Jing ZHANG, slide No. QWD17337; 1♂, Jiangfengling Nature Reserves, Ledong County, 70 m, 13-VII-2014, coll. Peixin CONG, Linjie LIU & Sha HU; 1♂, Diaoluoshan Nature Reserves, Lingshui County, 980 m, 24-IV-2014, coll. Tengting LIU, Wei GUAN & Xuemei HU, slide No. QWD17332; Fujian Province: 1♂1♀, Mt. Tianzhu, Xiamen, 220 m, 19-IX-04-X-2010, coll. Yinghui SUN & Jing ZHANG, slide No. QWD17412♂; 1♀, Zengcuoan, Xianmen, 24-IV-2012, coll. Zhibo WANG; Guangxi Zhuang Autonomous Region: 1♂, Qinmu Village, Yongfu County, 160 m, 05-V-2008, coll. Hui ZHEN & Li ZHANG; Yunnan Province: 26♂1♀, Lvshilin, Xishuangbanna Nature Reserves, 18-V-05-VI-2015, coll. Zhenguo ZHANG, slide Nos. QWD17413♂, QWD17422♂, QWD17416♀; 15♂1♀, Xishuangbanna Nature Reserves, 23-28-V-2015, coll. Zhenguo ZHANG, slide Nos. QWD17415W♂, QWD17421♂, QWD17423♀; 2♂, Jingdong County, 06-VI-2013, coll. Zhenguo ZHANG.

Diagnosis. This new species is similar to *A. obtusisella* sp. nov. and *A. nathani* Munroe & Mutuura, 1969. It can be distinguished by the thorn-shaped sella pointed at apex in the male genitalia and the broad U-shaped lamella antevaginalis in the female genitalia. In *A. obtusisella* sp. nov., the bar-shaped sella is rounded at apex, and the sub-trapezoidal lamella antevaginalis is deeply incised medially on the posterior margin. In *A. nathani*, the sella is rounded, and the funnel-shaped lamella antevaginalis is not concave medially (Munroe & Mutuura 1969: Fig. 10).

Distribution. China (Fujian, Guangxi, Hainan, Yunnan).

Etymology. The specific epithet is derived from the Latin *acer-* and *sella*, referring to the sella of male genitalia being pointed at apex.

Remarks. Specimens collected from Yunnan are larger in size (wingspan 26.0–31.0 mm) and deeper in color (greyish brown). Both the male and female genitalia are structurally the same except those from Yunnan being larger. We tentatively treat these as variations in this paper.

2. *Anamalaia obtusisella* Li sp. nov. (Figs. 2, 9, 10, 12, 15)

Description. Adult (Figs. 9, 10) wingspan 19.0–24.0 mm. Head with vertex pale earthy yellow; frons earthy yellow, laterally with a white stripe. Antenna earthy yellow, scape and basal two to six segments of flagellomeres white on anterior margin. Labial palpus with first segment white; second segment brown except ventral 1/6 white; third segment brown. Maxillary palpus brown. Proboscis with basal scales yellowish white. Thorax and tegula earthy yellow. Forewing earthy yellow, darker in basal and distal regions; markings grey: antemedial line starting from basal 1/4 of costal margin to basal 1/4 of dorsum, slightly arched outward; discal stigma greyish black; postmedial line from distal 1/3 of costal margin obliquely outward to middle of CuA₁, then retracted to middle of CuA₂, finally oblique inward to distal 2/5 of dorsum, edged with pale earthy yellow scales along outer margin; termen with blackish brown dots. Hindwing earthy yellow, darker from beyond postmedial line to apex;

postmedial line from distal 2/5 of Rs obliquely outward to distal 1/4 of 1A, then retracted to distal 1/4 of 2A, finally nearly straight to anal angle, edged with pale earthy yellow scales along outer side; termen with blackish brown dots.



Figures 11, 12. Male genitalia of *Anamalaia* spp. 11. *A. acerisella* sp. nov., holotype, slide No. QWD17341; 12. *A. obtusisella* sp. nov., holotype, slide No. QWD17397; 13–15. Female genitalia of *Anamalaia* spp.; 13. *A. acerisella* sp. nov., paratype from Hainan, slide No. QWD17345; 14. *A. acerisella* sp. nov., paratype from Yunnan, slide No. QWD17423; 15. *A. obtusisella* sp. nov., paratype, slide No. QWD17311. Scale bars = 0.5 mm.

Male genitalia (Fig. 12). Uncus broad at base, narrowed toward rounded apex, with dense setae along laterodistal 1/3. Valva with basal 3/4 subparallel, distal 1/4 slightly narrowed to rounded apex; costa narrowly banded, tapering to distal 1/4 of costal margin, produced to a triangular process ventrobasally; transtilla arms thorn-shaped, meeting medially. Sacculus with basal 2/5 narrower than distal 3/5, with short fine setae, oblique apically; dorsal process at middle, thorn shaped. Editum large sub-square, with scale-like setae on dorsal margin, with dense fine setae medially; sella bar-shaped, dentate along outer side, obtuse at apex. Juxta

shallowly concave at middle on both anterior and lateral margins, widened posteriorly, broad V-shaped at middle on posterior margin, with a longitudinal ridge along middle line. Vinculum triangular, with a blade-like process at middle on dorsal surface. Phallus approximately 5/7 length of valva, spinulose distally, with a cluster of compact spines at middle, sometimes deciduous.

Female genitalia (Fig. 15). Ovipositor rounded caudally, setose. Apophyses anteriores about 1.8 times length of apophyses posteriores. Lamella postvaginalis weakly sclerotized, sub-rectangular. Lamella antevaginalis heavily sclerotized, sub-trapezoidal, median part straight on anterior margin, deeply incised at middle on posterior margin. Antrum almost as long as lamella antevaginalis, uniform except slightly concave and sclerotized lateromedially. Ductus bursae membranous, with a sclerite extending from end of antrum, about half length of antrum, ductus seminalis arising from between this sclerite and antrum. Corpus bursae round, with a pair of denticulate sclerites at entrance; appendix from middle of left side, slightly shorter than corpus bursae, ovate distally; signum sub-rhomboidal, with dense denticles arranged in numerous rows except smooth in median area, transversely with a ridge interrupted medially, produced straight to a point from either side, longitudinally produced to a slender process from either side.

Holotype. ♂, **China**, Bawangling, 19.10°N, 109.11°E, Changjiang County, Hainan Province, 245 m, 09-V-2013, coll. Yinghui SUN, Wei GUAN & Tengting LIU, slide No. QWD17397. **Paratypes.** 7♂11♀. **China**, Hainan Province: 3♂, 07–9-V-2013, other data same as holotype, slide Nos. QWD17410, QWD17419W; 1♀, Limushan Nature Reserves, Qiongzong County, 640 m, 02-V-2014, coll. Tengting LIU, Wei GUAN & Xuemei HU; 3♀, Yinggeling, 620 m, 18-IV–23-V-2010, coll. Bingbing HU & Jing ZHANG, slide No. QWD17411; 1♂1♀, Mt. Wuzhi, 700 m, 18–19-V-2007, coll. Zhiwei ZHANG & Weichun LI, slide No. CN10042♂; 1♂, Maoyang Town, Wuzhishan City, 225 m, 18-IV-2009, coll. Qing JIN & Bingbing HU, slide No. QWD17417; 1♂2♀, Shuiman Town, Wuzhishan City, 630 m, 16-IV-2009, coll. Qing JIN & Bingbing HU, slide Nos. QWD17424♀, QWD17425♀; 1♂1♀, Shuiman Town, Wuzhishan City, 31-V–01-VI-2010, coll. Bingbing HU & Jing ZHANG; 1♀, Wuzhishan Nature Reserves, 742 m, 21-V-2015, coll. Peixin CONG, Wei GUAN & Sha HU, slide No. QWD17311; 2♀, Diaoluoshan Nature Reserves, 922 m, 24–25-V-2014, coll. Peixin CONG, Wei GUAN & Sha HU.

Diagnosis. This new species is similar to *A. acerisella* sp. nov. and *A. nathani* Munroe & Mutuura, 1969. The difference between them is stated under the previous species.

Distribution. China (Hainan).

Etymology. The specific epithet is derived from the Latin *obtus-* and *sella*, referring to the sella being rounded at apex.

Discussion

Munroe and Mutuura (1969) stated that “gnathos a narrow bridge and transtilla arms meeting medially and with a process on each side extending towards juxta” when they established the genus *Anamalaia*. However, we do not find the gnathos in the figure they provided (Munroe & Mutuura 1969: Fig. 10), and we have not identified it either of the two new species described in this paper. Since the gnathos in Pyraustinae is mostly absent, we

infer that the gnathos is absent in *Anamalaia*. In addition, we regard the process of transtilla that they described as a prolonged ventrobasal extension of the costa.

The forewing has a glandular swelling in male at the costal margin of *A. acerisella* sp. nov. (Fig. 6), but it is absent in *A. obtusisella* sp. nov. And Munroe and Mutuura (1969) did not mention its existence in describing *A. nathani*. The glandular swelling on the forewing can be present or absent within a genus in Epipaschiinae. However such feature is seldom mentioned in Pyraustinae. In this context, we treat the two new species as belonging to the same genus, *Anamalaia*.

Acknowledgements

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